

## **REAL PARTY IN INTEREST**

The real party in interest is SILVERBROOK RESEARCH PTY LTD, the assignee of record.

## **RELATED APPEALS AND INTERFERENCES**

None

## **STATUS OF CLAIMS**

<b>Claim</b>	<b>Status</b>
1	Rejected
2	Rejected
3	Rejected
4	Rejected
5	Rejected
6	Rejected
7	Rejected
8	Rejected
9	Cancelled
10	Cancelled
11	Rejected
12	Rejected
13	Cancelled
14	Cancelled
15	Cancelled
16	Cancelled
17	Rejected
18	Rejected
19	Rejected
20	Rejected
21	Rejected
22	Rejected

## **STATUS OF AMENDMENTS**

The claims as pending are as received by the USPTO on November 26, 2008.

## **SUMMARY OF CLAIMED SUBJECT MATTER**

Independent claim 1 is directed to a three dimensional object creation system (200 - Fig. 2; pp. 18, ln. 6 - 10) for printing a three dimensional object comprised of layers (110, 114, 118, 119 - Fig. 2) stacked vertically with respect to each other. The system (200) comprises a series of printheads (206 - Fig. 2; pp 18, ln. 24 - 25) for printing the layers (110, 114, 118, 119). The series of printheads (206) simultaneously print at least two layers of different vertical positions within the stack.

The claimed three dimensional object creation system (200) further comprises a semiconductor memory (pp. 32, ln. 15 - pp 34, ln. 5) for storing data defining at least one layer. The system (200) is operable to reconfigure a printhead initially configured to print a layer at a first vertical position to print a layer at a second vertical position.

## **GROUNDS OF REJECTION TO BE REVIEWED**

1. Whether claims 1, 2, 7, 11 - 12, and 17 are unpatentable under 35 U.S.C. 103 over Penn et al. (US 6,169,605) in view of Jang et al. (US 2002/0062909).

## **ARGUMENTS**

### **(1) REJECTION UNDER 35 U.S.C. 103(a) OVER PENN ET AL. (US 6,169,605) IN VIEW OF JANG ET AL. (US 2002/0062909)**

#### **Claims 1, 2, 7, 11 - 12, and 17**

Independent claim 1 is rejected as unpatentable under 35 U.S.C 103(a) over Penn et al. in view of Jang et al.

In rejecting independent claim 1, the Examiner contends that Penn et al. teach printing at least two layers of different materials within a stack simultaneously. However, the Examiner acknowledges that Penn et al. fail to teach the simultaneous printing of two layers of different vertical positions within the stack. To account for this deficiency of Penn et al., the Examiner cites Jang et al. The Examiner makes two assertions with regards to Jang et al. Firstly, the Examiner contends that Jang et al. teach simultaneously printing at least two layers of different vertical positions within the stack. Secondly, the Examiner contends that Jang et al., even if overlooking the above first assertion, provide a teaching that when combined with Penn et al. make the claimed invention obvious.

Applicant respectfully traverses the Examiner's above assertions.

Turning first to the Examiner's first assertion of Jang et al., the Examiner contends that Jang et al. teach the feature of simultaneously printing at least two layers of different vertical positions within the stack because Jang et al. teach "*providing means to ... simultaneously affix successive layers together to form a unitary body*" (para. [0117]). Applicant respectfully submits that this teaching of Jang et al. does not in fact teach or suggest simultaneously printing at least two layers of different vertical positions within the stack.

Claim 1 explicit recites that at least two layers of different vertical positions are simultaneously printed, not affixed. Jang et al., in describing that layers can be simultaneously affixed, does not prejudice this feature of claim 1. The fact that Jang et al. simultaneously affix two layers together has no bearing whatsoever on whether those two layers were printed simultaneously. In fact, Applicant points out that in order to affix two layers, the two layers must have already been printed. One cannot affix two layers when the two layers do not yet even exist. Accordingly, the Examiner's reliance on this teaching of Jang et al. at paragraph [0117] is untenable.

In fact, taking into account the description of Jang et al. provided in preceding paragraphs [0114] - [0116], the portion of Jang et al. relied upon by the Examiner supports Applicant's assertion that Jang et al. do not simultaneously print at least two layers of different vertical positions within the stack. When taking into account the context of these preceding paragraphs, it is clear that Jang et al. print a first layer, then print a second layer, then affix the first and second layer together.

Therefore, the Examiner's statement of "*Here, "simultaneously affix together" by a 3D solid freeform fabrication printer is [sic] substantially means simultaneously printing said*

*two layers*" is respectfully submitted to be completely untenable. Jang et al. clearly teach a printing step that is separate from and which precedes the affixing step. In referring to the affixing step of Jang et al. as a printing step, the Examiner's construction and interpretation of Jang et al. is repugnant to the explicit teachings provided by Jang et al. themselves.

Turning next to the Examiner's combination of Penn et al. with Jang et al., Applicant respectfully submits that the Examiner is relying on improper hindsight in making such a combination, and that such a combination would not in any case arrive at the claimed invention when the teachings of the cited references are considered in their full and proper context.

In combining Penn et al. with Jang et al., it is Applicant's understanding that the Examiner's rationale is as follows:

- Penn et al. teach that two printheads can print two "layers" within the same vertical position in a stack simultaneously.
- Penn et al. do not teach that the two printheads can print two layers in different vertical positions in a stack simultaneously.
- Jang et al. teach that a printhead can be reconfigured from a first vertical position to a second vertical position to print a layer at the second vertical position in a stack.
- Therefore, this "reconfiguration" teaching of Jang et al. can be combined with Penn et al. to reconfigure one of the printheads of Penn et al. to print a layer at a different vertical position in the stack, instead of printing a layer at the same position as the other printhead.

The Examiner's above rationale is untenable because it very clearly relies on Applicant's own teaching, and hence improper hindsight. Further, the above rationale takes the teachings of Jang et al. out of context.

Firstly, Applicant points out that when taken in its full and proper context, Jang et al. teach only to reconfigure a printhead to print a different layer at a different vertical position in a stack after the current layer that the printhead was printing is complete. Jang et al. do not teach to reconfigure the printhead to print a subsequent vertical layer while a current vertical layer is not yet complete. Accordingly, combining this teaching of Jang et al. into the invention of Penn et al. still would not arrive at the claimed invention, since the resultant combination would only vertically reconfigure the printhead(s) of Penn et al. after a current vertical layer being printed is completed. Hence, simultaneous printing of different vertical layers is not achieved.

Both Penn et al. and Jang et al. rely on the assumption that a preceding vertical layer needs to be complete before a subsequent vertical layer on top of the preceding layer can be formed. For example, Penn et al. state that the printed circuit board is formed in a layerwise fashion (col. 16, lines 57 - 58) where one vertical layer comprising both conductive and insulating material is completely formed in a single pass (col. 16, lines 49 - 51). Similarly, paragraphs [0111] to [0118] of Jang et al., together with Fig. 3, clearly indicate that vertical layers are formed one after the other, and not simultaneously. In view of these explicit teachings, the Examiner's suggestion that the combined teachings of Jang

et al. and Penn et al. render obvious the claimed system in which different vertical layers are simultaneously printed is unsupported.

When taken in its proper context, Applicant notes in fact that the teaching of Jang et al. is already present in Penn et al. in exactly the same manner as used in Jang et al. In Jang et al., the printhead is reconfigured to print at another vertical position in the stack after a preceding layer has been completed. In Penn et al., the same process occurs. After a layer at a given vertical position in a stack is printed (in a single pass), the printheads are “reconfigured” to print a subsequent vertical layer above the layer just printed.

Accordingly, the combination of Jang et al. with Penn et al. in fact adds nothing additional to the teachings of Penn et al., and more specifically, fails to make up for the deficiency of Penn et al. with respect to claim 1.

Secondly, and in addition to the above, as neither Penn et al. nor Jang et al. teach or suggest the combination as proposed by the Examiner, Applicant questions where motivation or suggestion for such a combination would come from. Applicant points out that the mere statement that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness (MPEP 2143.01 IV). Further, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art. (MPEP 2143.01 III; *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007)).

Applicant does not see how a variation of Penn et al. in view of Jang et al. to arrive at the claimed invention can be a “predictable variation”. In both references, one vertical layer is completed before a subsequent vertical layer is printed on top of the layer just complete. The “reconfiguration” feature taught by Jang et al. is clearly a reconfiguration performed after one vertical layer is completed. A variation of Penn et al. such that one of the printheads is moved to a different vertical position to commence printing of a subsequent vertical layer is not predictable at all from the teachings of the presently cited references, nor simply from common knowledge in the art at the time. Further, such a variation would change the single-pass principle of operation utilized by Penn et al., and as such would be an improper variation (MPEP 2143.01 VI). Without changing the principle of operation of Penn et al. (i.e. a one pass printing of a vertical layer including both conductive and insulating material), Penn et al. cannot be modified to print two or more vertical layers simultaneously.

The Examiner’s above rationale appears to have been customized solely to reject the claimed invention, rather than be a natural conclusion from the teachings of Penn et al. and Jang et al. Applicant respectfully submits that this rationale is therefore based on the teachings provided by the Applicant’s own disclosure.

Absent Applicant’s own disclosure, and considering only the disclosures provided by Penn et al. and Jang et al., Applicant submits that there is no suggestion or motivation whatsoever to combine the references according to the Examiner’s rationale. The fact remains that neither Penn et al. nor Jang et al. suggest printing at least two layers at different vertical positions in a stack simultaneously. The fact that one “could” modify Penn et al. such that one of the printhead is reconfigured to print a different vertical layer from the other printhead is a moot point, because such a modification is not a “predictable

variation". In fact, the disclosures of Penn et al. and Jang et al., in both assuming that one vertically layer must be complete before a subsequent vertical layer can be formed on top thereof, fairly suggest that such a variation would have been un-predictable.

Further, with reference to the following statement made by the Examiner:

*"Here, the combination is the predictable substitution of printing two layers of distinct materials in a single horizontal layer with printing two layers of distinct materials in two vertically stacked layers, which is obvious to one of ordinary skill in the art at the time of the invention because the combination is the predictable use of two known methods according to established properties."*

Applicant firstly notes that the combination is not the predictable use of two "known" methods. The Examiner has not established any two relevant "known" methods that in combination could arrive at the claimed invention. As mentioned above, Jang et al. teach only that a printhead can be reconfigured after a current layer is complete, so as to print a subsequent layer at a different vertical position in the stack. Penn et al. teach only that two "layers" in the same vertical position of the stack can be simultaneously printed. These two "known" methods in combination do not arrive at the claimed feature of printing two layers of different vertical positions in a stack, simultaneously.

In order to arrive at the claimed invention, one would need to modify Penn et al. so as not to utilize its single-pass principle of operation. Further, one would need to further add (from some unknown source) to the teaching of Jang et al. such that a printhead is vertically reconfigured at any time during the printing of any vertical layer, rather than only at the completion of the printing of one vertical layer. Only then, would the claimed invention be taught. Such a combination is neither predictable, nor a use of two known methods.

Further, such a substitution is not predictable because in the printing of two materials in one vertical layer, there is no physical nor causal dependence on one material on the other. On the other hand, in the printing of two materials in different vertical layers, there exist such a dependence. For example, a material in a higher layer clearly cannot be printed if a material directly underneath in a lower layer has not already been printed. Clearly, a material cannot be printed suspended/levitated in mid-air. This dependence makes the simultaneous printing of two vertical layers much more than a mere "predictable substitution" of a method in which two materials in the same vertical layer are simultaneously printed. Clearly, significantly more thought and experimentation are required to account for the complexities introduced by this dependence between vertical layers as compared to the independence in the printing of materials in the same level.

For the above reasons, Applicant maintains that independent claim 1, and the claims dependent therefrom are novel and inventive.